Comprehensive Long-Term Environmental Action Navy (CLEAN) II
Contract No. N62742-94-D-0048
Contract Task Order No. 0072

Amendment No. 2 to Work Plan

Phase II Remedial Investigation

IRP Site 1, Explosive Ordnance Disposal Range, Former Marine Corps Air Station, El Toro, California

Prepared for

Department of the Navy
Commander, Southwest Division
Naval Facilities Engineering Command
San Diego, California 92132-5190

Prepared by

Earth Tech, Inc.
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December 2002

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Contract No. N62742-94-D-0048
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CTO #: 072
LOCATION: MCAS El Toro

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DESCRIPTION: Work Plan Amendment No. 2, Phase II Remedial Investigation, IRP Site 1, MCAS El Toro

TYPE: ____ Contract Deliverable (Cost) ____ CTO Deliverable (Technical) ____✔ Other

VERSION: ____ REVISION #s: ____

ADMIN RECORD: Yes ____ No ____ Category ____ Confidential ____
(PM to Identify)

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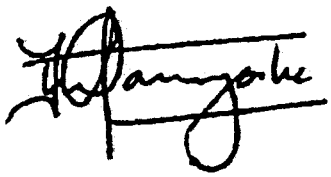
Amendment No. 2 to Work Plan
Phase II Remedial Investigation at IRP
Site 1, Explosive Ordnance Disposal Range
Former MCAS El Toro, California

Contract No. N62742-94-D-0048
Contract Task Order No. 0072

Reviews and Approvals:



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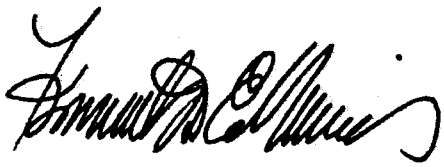

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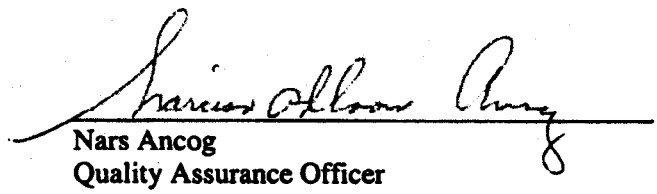

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PAGE NO. ii

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M60050.002910
MCAS EL TORO
SSIC NO. 5090.3

FINAL WORK PLAN
PHASE II REMEDIAL INVESTIGATON IRP SITE, EXPLOSIVE ORDNANCE DISPOSAL RANGE

DATED 27 NOVEMBER 2001

IS ENTERED IN THE DATABASE AND FILED AT ADMINISTRATIVE RECORD NO. **M60050.002577**

AMENDMENT NO.1
TO THE WORK PLAN
PHASE II REMEDIAL INVESTIGATON IRP SITE EXPLOSIVE ORDNANCE DISPOSAL RANGE

DATED 21 NOVEMBER 2002

IS ENTERED IN THE DATABASE AND FILED AT ADMINISTRATIVE RECORD NO. **M60050.002868**

DRAFT FINAL
SAMPLING AND ANALYSIS PLAN
AMENDMENT NO.1 - PHASE II
REMEDIAL INVESTIGATON IRP SITE
EXPLOSIVE ORDNANCE DISPOSAL RANGE

DATED 3 MARCH 2004

IS ENTERED IN THE DATABASE AND FILED AT
ADMINISTRATIVE RECORD NO. **M60050.003051**

FINAL SAMPLING AND ANALYSIS PLAN
AMENDMENT NO.1 - PHASE II
REMEDIAL INVESTIGATON IRP SITE
EXPLOSIVE ORDNANCE DISPOSAL RANGE

DATED 1 DECEMBER 2004

IS ENTERED IN THE DATABASE AND FILED AT
ADMINISTRATIVE RECORD NO. **M60050.003214**

AMENDMENT NO. 3
TO THE WORK PLAN
PHASE II REMEDIAL INVESTIGATION IRP SITE, EXPLOSIVE ORDNANCE DISPOSAL RANGE

DATE 11 JANUARY 2005

IS ENTERED IN THE DATABASE AND FILED AT ADMINISTRATIVE RECORD NO. **M60050.003220**

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ACRONYMS AND ABBREVIATIONS
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AMENDMENT NO. 2
TO WORK PLAN PHASE II REMEDIAL
INVESTIGATION

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1. INTRODUCTION

Results of groundwater samples collected during the Remedial Investigation at Installation Restoration Program (IRP) Site 1, the former explosive ordnance disposal (EOD) range, Marine Corps Air Station (MCAS) El Toro, California, have indicated Perchlorate concentrations in excess of regulatory thresholds. Based upon the most recent perchlorate data, additional assessment is required in order to evaluate the extent of the perchlorate plume and to evaluate the groundwater gradient directions in the northern area of Site 1. This Work Plan details the investigation strategy for this work.

This project was authorized by the United States (U.S.) Navy, Pacific Division, Naval Facilities Engineering Command (PACDIV) under contract task order (CTO) no. 0072 of the Comprehensive Long-Term Environmental Action Navy (CLEAN) II program, contract number N62742-94-D-0048. The project organization is presented in Figure 1.

This Work Plan Amendment supplements the *Final Work Plan, Phase II Remedial Investigation, IRP Site 1, Explosives Ordnance Range, Marine Corps Air Station El Toro, California,* approved November 27, 2001 (Earth Tech 2001).

1.1 MCAS EL TORO BACKGROUND

MCAS El Toro is located in a semi-urban, agricultural area of southern California, approximately 8 miles south of Santa Ana and 12 miles northeast of Laguna Beach. MCAS El Toro covers approximately 4,738 acres. Land use around the MCAS includes commercial, light industrial, and residential. MCAS El Toro closed on 2 July 1999, as part of the Base Realignment and Closure (BRAC) Act.

Initial work conducted by the Department of the Navy (DON) at MCAS El Toro included an initial assessment study during 1985 (NEESA 1986).

MCAS El Toro was added to the National Priorities List (NPL) of the Superfund Program on 15 February 1990, due to volatile organic compounds (VOCs) contamination at the MCAS boundary and in the agricultural wells west of MCAS. A Federal Facilities Agreement (FFA) was signed by the Marine Corps/DON in October 1990 with the EPA Region IX, California Department of Health Services (DHS) (part of which is currently DTSC), and the California Regional Water Quality Control Board, Santa Ana Region (CRWQCB).

In March 1993, MCAS El Toro was placed on the list of military facilities scheduled for closure under the BRAC Act. A BRAC Cleanup Team (BCT) including representatives from Southwest Division Naval Facilities Engineering Command (SWDIV), EPA, DTSC, and CRWQCB was formed to oversee implementation of the FFA.

Implementation of the FFA at MCAS El Toro included the following investigations and studies: Air Quality Solid Waste Assessment Test (Air SWAT), phase I RI, phase II RI, and a feasibility study (FS). Groundwater sampling is conducted station-wide on a routine basis by the Navy.

1.2 IRP SITE 1 BACKGROUND

IRP Site 1 is located in the northeast portion of MCAS El Toro in the foothills of the Santa Ana Mountains (see Figure 2). Site 1 is situated within a tributary canyon of Borrego Canyon Wash at elevations ranging from approximately 610 to 760 feet above mean sea level (MSL). Site 1 includes

the Northern EOD Range (approximately 737,250 square feet) and the Southern EOD Range (approximately 721,600 square feet) (BNI 1995).

A bermed retention pond is present in the northern portion of the site. Seasonal accumulations of rainwater were reported to have been observed in the retention pond. However, no ponding or accumulation contributing to surface water flow was observed (June 1999 to present) by Earth Tech. The site has been characterized by fairly rapid groundwater recharge in response to storm events (JEG 1993).

2. WORK PLAN

2.1 PURPOSE

Sampling will be conducted in order to evaluate the extent of the perchlorate plume in the central area of Site 1 and to evaluate the groundwater gradient directions in the northern area of Site 1.

2.2 SCOPE

The scope of this work is to collect data to characterize site conditions; document the nature of the waste at Site 1, assess risk to human health and the environment; and conduct treatability testing as necessary to evaluate the potential performance and cost of treatment technologies that are being considered. This information will be used to evaluate appropriate response actions to support the decision-making process for further course of action in conjunction with the reuse options (Earth Tech 2001). This Work Plan Addendum specifically addresses additional delineation of the perchlorate plume at IRP Site 1.

2.3 GROUNDWATER SAMPLING BACKGROUND

During previous investigations, perchlorate was identified at concentrations exceeding regulatory thresholds in groundwater beneath Site 1. During the Perchlorate Verification Study conducted at Site 1 in November 1999, perchlorate was detected in 3 of the 12 monitoring well samples (although only the sample collected from monitoring well 01-MW201 exceeded the state and Federal provisional action levels [PALs]).

As part of the recent Phase II RI activities, all Site 1 monitoring wells were sampled in January 2002. The results were consistent with previous results with the following exceptions. Chlorinated volatile organic compounds (VOCs) were detected in 01-MW102 in the northwest corner of Site 1. In addition, perchlorate was detected, confirming previous detections of perchlorate at this location that were at or below typical reporting limits.

Due to these results, a second sampling event was recommended to confirm these findings. In addition, due to regulatory concerns regarding the groundwater gradient direction, three additional groundwater monitoring wells were installed. Following the installation of these wells, a second sampling event for all Site 1 groundwater monitoring wells was conducted in June 2002.

Perchlorate was detected in newly installed well 01-MW210 at 79.6 micrograms per liter (µg/L). A confirmation sample collected in July (one month after the initial sample) was reported to contain 148 µg/L perchlorate. Perchlorate was not expected to be present in this monitoring well because it's location is upgradient from the suspected source area. Newly installed well 01-MW209 was reported to contain 338 µg/L perchlorate. Due to the significant concentrations of perchlorate detected in 01-MW209 and 01-MW210, additional assessment is needed to delineate the perchlorate plume in the central portion of Site 1.

In the northern portion of Site 1, a northwestern groundwater gradient direction has been inferred based upon groundwater elevation data from monitoring wells 01-MW101, 01-MW102, and 01-MW202. This northwestern gradient is not consistent with the surface topography in this area. Due to the very low concentrations of perchlorate reported in monitoring well 01-MW102, a better understanding of groundwater gradient directions in the northern area is necessary.

3. SAMPLING AND ANALYSIS PLAN

Fieldwork will be performed in accordance with applicable CLEAN standard operating procedures (SOPs) (BNI 1999). Earth Tech field personnel will have copies of all referenced SOPs during the fieldwork. Approved CLEAN SOPs were submitted to the BCT by the SWDIV; copies of the SOPs can be provided to reviewers of this document, if requested.

3.1 SAMPLING DESIGN

In order to evaluate the groundwater gradient directions in the northern area of Site 1, four boreholes will be drilled with 8-inch hollow-stem auger to at least 15 feet below the water table (01-PZ/HP-01 through 01-PZ/HP-04, see Figure 2). Following drilling operations, 2-inch piezometers will be installed in each of the four boreholes. Screens for piezometers will extend from 10 feet above the water table to the bottom of the borehole.

In order to delineate of the perchlorate plume in the central area of Site 1, eight hydropunch samples will be attempted using direct-push techniques (01-PZ/HP-05 through 01-PZ/HP-12, see Figure 2). It is anticipated that several of the hydropunch samples will not be possible due to the underlying geology of the site and the anticipated depth to groundwater. At any location where hydropunch sampling is not possible, the direct-push equipment will be removed and a piezometer will be installed using hollow-stem auger techniques as above.

To evaluate the detections of Perchlorate in groundwater monitoring well 01MW207 that is close to the ephemeral streams leaving Site 1, hydropunch samples will be attempted at four locations using direct-push techniques (01-PZ/HP-13 through 01-PZ/HP-16, see Figure 3). All four locations are situated along streams influenced by runoff from Site 1. As before, at any location where hydropunch techniques are deemed not possible, a piezometer will be installed using hollow-stem auger.

Additionally, groundwater samples will be collected from existing wells that have had consistent detections of perchlorate. The following seven wells will be sampled during this investigation: 01-MW102, 01-MW201, 01-MW202, 01-MW207, 01-MW208, 01-MW209, and 01-MW210.

3.2 DATA COLLECTION

The field crew will collect groundwater samples from each selected groundwater monitoring well, piezometer, or hydropunch sampling locations in accordance with CLEAN SOP 8, Groundwater Sampling (BNI 1999d).

After sample collection, sample container lids and caps will be covered with custody seals. All samples will be recorded on chain-of-custody (COC) forms in accordance with CLEAN SOP 10, Sample Custody, Transfer and Shipment (BNI 1999). Samples will be shipped or delivered within 24 hours to allow the laboratory to meet holding times for analysis. All samples will be analyzed for Perchlorate by the modified METHCLO4 or WW 314.1 method. Quality control criteria will be consistent with the Phase II RI Work Plan (Earth Tech 2001).

4. DATA EVALUATION

The results of the sampling will be evaluated and incorporated into the Remedial Investigation data set and subsequently used in human health risk assessment.

5. REFERENCES

Bechtel National, Inc. (BNI). 1995. *Final Work Plan Phase II Remedial Investigation/Feasibility Study*, San Diego, CA.

_____. 1999. *CLEAN II Program Procedures Manual.* San Diego, CA.

Earth Tech. 2001. *Final Work Plan, Phase II Remedial Investigation, IRP Site 1, Explosives Ordnance Range, Marine Corps Air Station El Toro, California.* Honolulu. November.

Jacobs Engineering Group, Inc. (JEG) 1993. *Draft Phase I Remedial Investigation Technical Memorandum.* Irvine, CA.

Naval Energy and Environmental Support Activity (NEESA). 1986. *Initial Assessment Study of Marine Corps Air Station, El Toro, California.* Port Hueneme, CA. May.

United States Army Corps of Engineers (USACE). 1998. *Range Identification and Preliminary Range Assessment.* Draft. MCAS El Toro. St. Louis. March.

Attachment 1
Figures

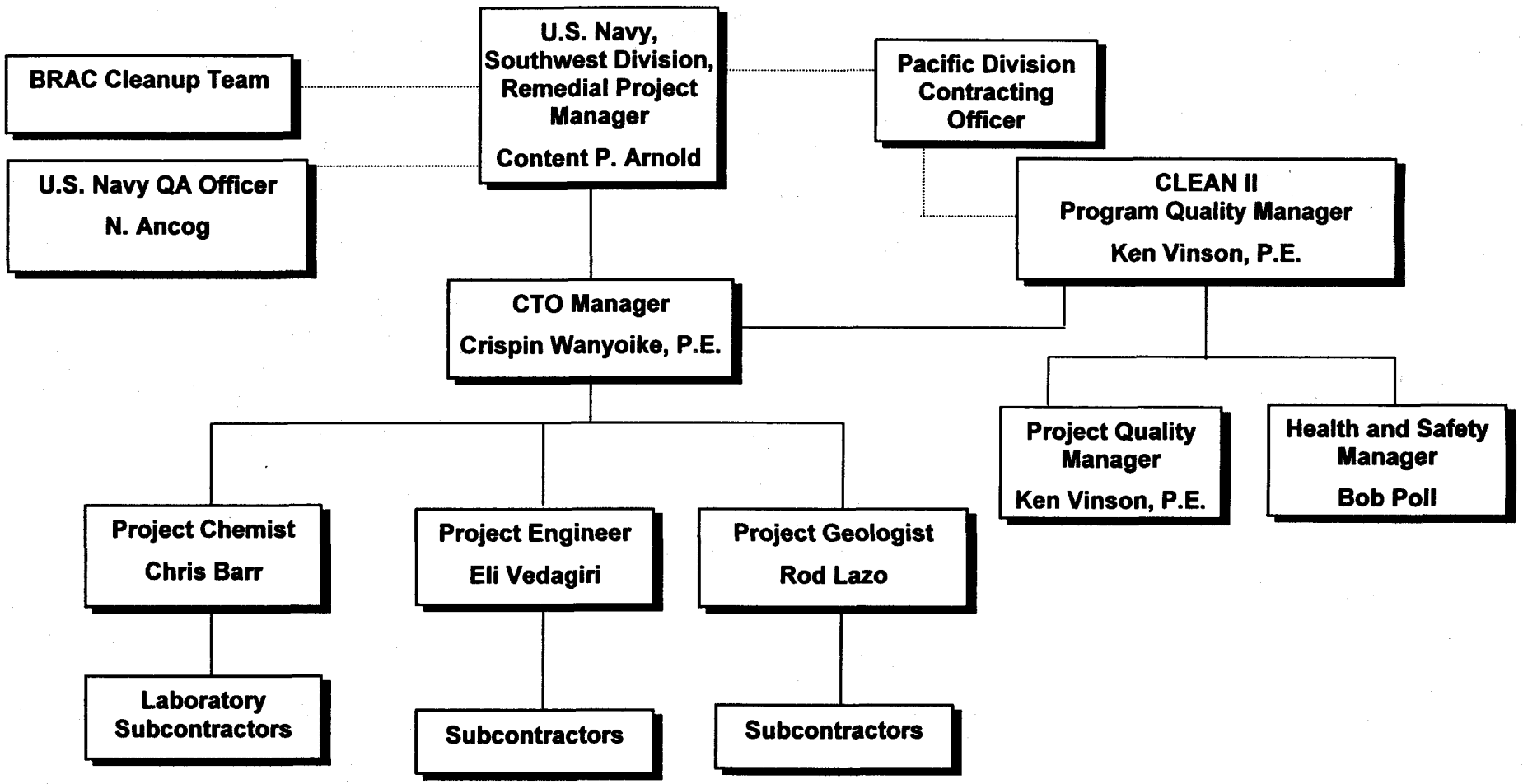
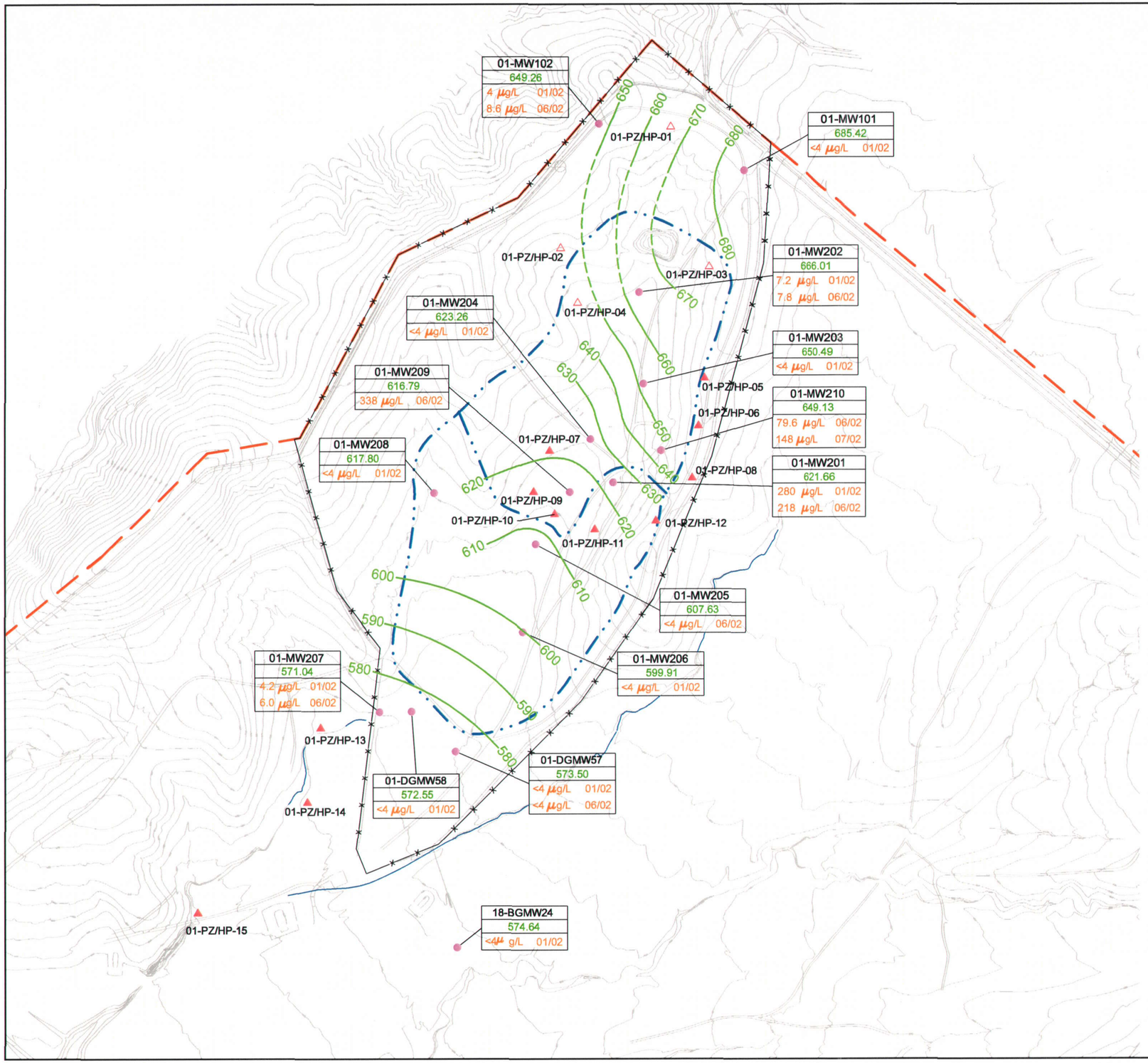


Figure 1. Project Organization Chart



LEGEND:

- MCAS EL TORO BOUNDARY
- SECURITY FENCE/ SITE 1 BOUNDARY
- EOD RANGE BOUNDARY
- STREAM OR WASH
- 650 — LINE OF EQUAL GROUNDWATER ELEVATION (1 AUG 2002), DASHED WHERE INFERRED
- 01-MW102 / 600.44 / <4 µg/L 01/02 — GROUNDWATER MONITORING WELL GROUNDWATER ELEVATION (1 AUG. 2002)
- ▲ PROPOSED HYDROPUNCH LOCATION
- △ PROPOSED PIEZOMETER LOCATION

NORTH

0 200' 400'

SCALE: 1"= 400'

Phase II RI

Site 1 Proposed Hydropunch Sampling Location

Remedial Investigation, Site 1 - EOD Range

Date: 11-02	Former MCAS El Toro	Figure 2
Project No. 36097	EARTH TECH — A tyco INTERNATIONAL LTD. COMPANY	

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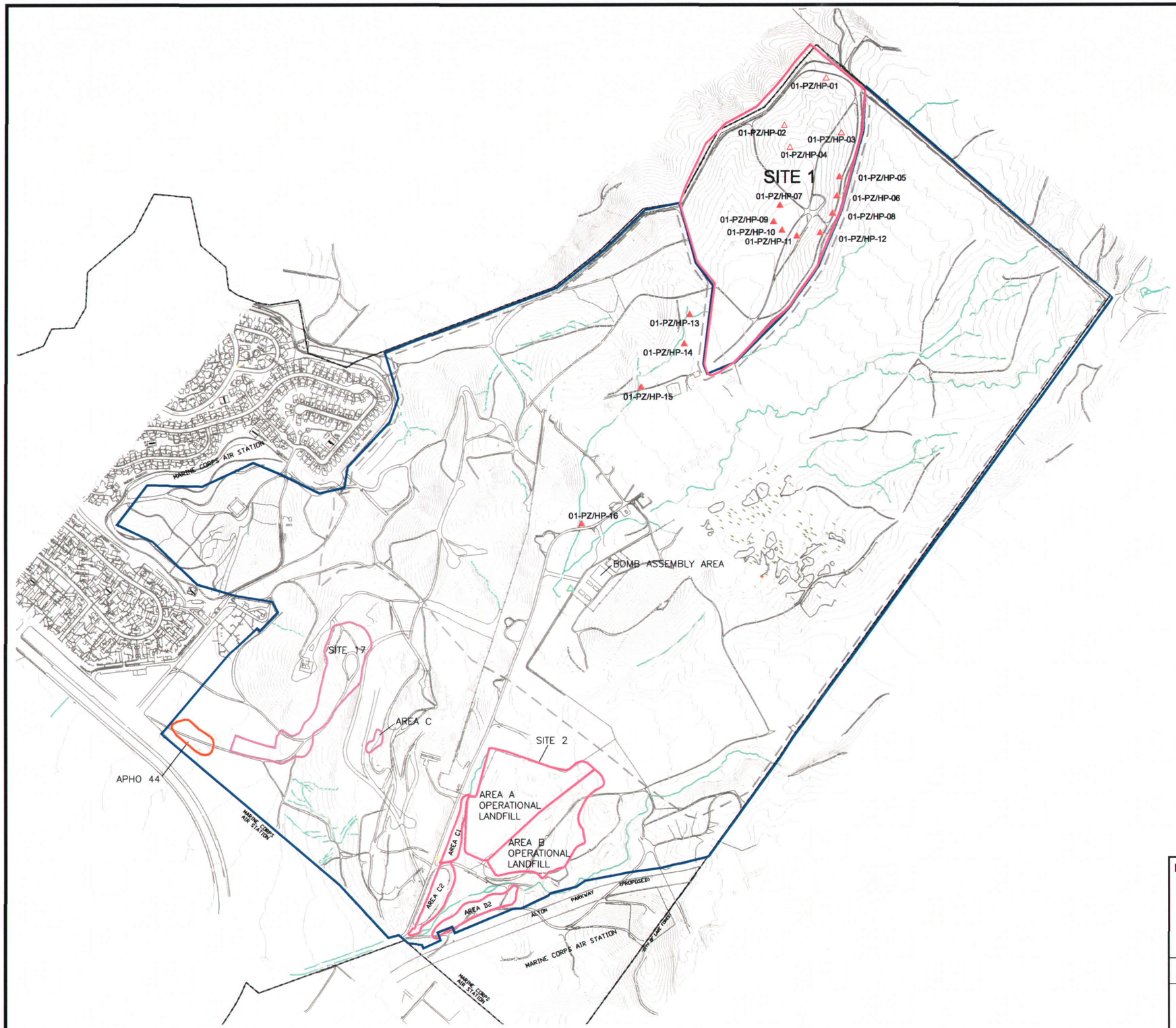

NOTE

TOPOGRAPHIC DATA WAS PROVIDED BY THE COUNTY OF ORANGE (DATE OF SURVEY, APPROXIMATELY 1997). AERIAL PHOTOGRAPHY DATED JULY, 2000 PREPARED BY SAN-LO AERIAL SURVEY.

LEGEND

- IRP SITES
- FAA PARCEL PER RECORD OF SURVEY 98-1077 BY JOHN CANAS L.S. 4408. DATE OF SURVEY: NOVEMBER, 1998
- PROPOSED WILDLIFE REFUGE OVERLAY
- STATION BOUNDARY
- STREAMS
- ▲ PROPOSED HYDROPUNCH LOCATION
- △ PROPOSED PIEZOMETER LOCATION

NORTH

0 1000 2000
SCALE IN FEET

Phase II RI

Site 1 Proposed Hydropunch Sampling Locations

Remedial Investigation, Site 1 - EOD Range

Date: 11-02	Former MCAS El Toro	Figure 3
Project No. 36097	EARTH TECH A tyco INTERNATIONAL LTD. COMPANY	

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